WE CLAIM :

1. A method for the generation of libraries of encoded magnetic particles comprising the steps of (a) generating a first sub-library of magnetic nanoparticles, (b) generating a second sub-library of encoded particles, and (c) bringing into contact said first sub-library with said second sub-library to covalently bind said magnetic nanoparticles to said encoded particles to form said library.

2. The method of Claim 1 further comprising the step (d) of providing a coupling site on the magnetic particles contained in said first sub-library

3. The method of Claim 1 further comprising the step (e) of providing a functional site onto the magnetic nanoparticles contained in said first sub-library.

4. A method for the generation of libraries of encoded magnetic particles comprising the steps of (a) generating a first sub-library of magnetic nanoparticles, (b) generating a second sub-library of encoded particles, (c) providing a coupling site on the magnetic nanoparticles contained in said first sub-library, and (d) bringing into contact said first sub-library with said second sub-library to covalently bind said magnetic nanoparticles to said encoded particles to form said library. .

5. The particle of Claim 4 further comprising the step of (e) providing a functional site onto the magnetic nanoparticles contained in said first library.

6. A method for the generation of libraries of encoded magnetic particles comprising the steps of (a) generating a first sub-library of magnetic nanoparticles, (b) generating a second sub-library of encoded particles, (c) providing a coupling site on the magnetic nanoparticles contained in said first sub-library, (d) providing a functional site onto the

magnetic nanoparticles contained in said first library, and (d) bringing into contact said first sub-library with said second sub-library to covalently bind said magnetic nanoparticles to said encoded particles to form said library

7. A library of encoded magnetic particles having a chemical diversity greater than 2.

8. An encoded magnetic particle made by the process of Claim 1.

9. An array comprising a substrate and a planar assembly of encoded and magnetic particles arranged in a designated area on said substrate.

10. The array of Claim 9 wherein said particles are encoded with an optical identifier.

11. A method of integrating sample preparation and bioassay using magnetic particles comprising the steps of:

providing a plurality of magnetic particles comprising at least two different particle populations, each population being distinguishable by a recognition molecule attached thereto, wherein the particles are attached to a chemical characteristic that uniquely identifies a biomolecule of interest that selectively binds to the recognition molecule;

providing a biological fluid containing biomolecules and allowing said biomolecules to interact with the recognition molecules on the magnetic particles;

removing the fluid along with unbound components thereof;

transforming the biomolecules bound to the magnetic particles to produce transformed biomolecules, wherein the transformed biomolecules remain attached to the magnetic particles on which they are synthesized;

performing a bioassay wherein the binding agents comprise the transformed biomolecules.

12. The method of claim 11, wherein the biomolecules of interest comprises mRNA and the

transforming comprises reverse transcribing said mRNA to produce cDNA, which is attached to the magnetic particles.

13. The method of claim 11, wherein the sample preparation and bioassay occur in the same compartment.

14. A method for performing a bioassay involving integration of sample preparation and parallel molecular interaction assay analysis, comprising

providing an apparatus comprising at least a sample preparation compartment and an assay compartment, and means for fluidically connecting the sample and the assay compartments;

providing, in the sample preparation compartment, a biological fluid containing a biomolecule of interest and a plurality of magnetic particles capable of binding to the biomolecule of interest, and allowing the magnetic particles to bind the biomolecules of interest;

removing the biological fluid along with unbound components of said fluid, while retaining the magnetic particles and the biomolecules bound to said particles;

releasing said biomolecules from said magnetic particles and transporting said biomolecules from the sample preparation compartment to the assay compartment through the fluidic means; and

performing a bioassay wherein the analyte in the bioassay comprises transported biomolecules of interest.

15. The method of Claim 14, further comprising transforming the biomolecule of interest, which is then used as an analyte in the bioassay.

16. The method of Claim 14, wherein the biomolecule of interest comprises mRNA and the transformation comprises reverse transcription of said mRNA to produce cDNA, and wherein the analyte in the bioassay comprises said cDNA and the binding agents

comprises oligonucleotides or other DNA probes.

17. The method of Claim 14, wherein the reverse transcription occurs in the sample preparation compartment, while said mRNA is bound to the magnetic particles, and the cDNA is released from said magnetic particles after the reverse transcription and transported to the assay compartment and used as an analyte in the bioassay.